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AUTOMATIC TAGGING OF WILD ANIMALS AND PROSPECTS FOR ITS USE

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The marking of vertebrate animals by various methods is widely employed in ecological investigations. In this article we suggest a new method of mass marking of animals, based on the use of auto-tagging snares.

While making investigations along traplines using the simplest animal-catching equipment (principally snares), and experimenting with various materials, we frequently encountered cases of broken snares. In the autumn of 1954 a hazel-hen which had carried away a snare was some time later found in another snare about 1 km. from the place of first capture. Similarly a marten was taken, which had previously been in a snare set by us and was carrying it round its neck. In the immediate vicinity of the town of Syktyvkar, a wolf was killed with a piece of a snare of 2 mm.- diameter wire on its neck. It was not possible to determine where and when the wolf had broken the snare.

In the course of ecological investigations during the autumn of 1955 we set 427 traps (snares) for capercailzies and 328 snares for hazel-hens, in eight combined traplines. There were frequent cases of breaking of snares. Often birds carrying part of a broken snare were taken a second time. For example, a capercailzie that broke away in full view of us from a double snare of 5 mm. wire was shot in early winter about 5 km. from the snaring site. One may frequently obtain information on animal movements from such occurrences.

Occasional and disconnected data, naturally, cannot provide good ecological material, but they suggested to us the possibility of automatic tagging of animals when they are taken in snares.

The principle of automatic-tagging snares devised by us consists in the fact that the snare does not tighten to the full extent on the neck of an animal taken by it, and also is

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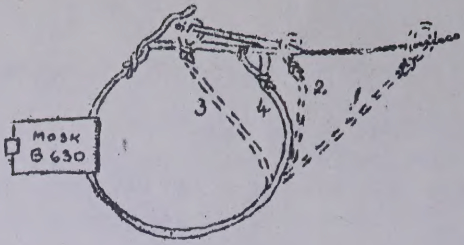

Fig. 1. Diagram of the principles of a device for automatic tagging of animals.

1, 2, 3, 4 - successive positions of sliding loop.

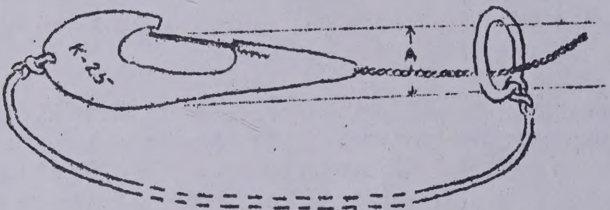

Fig. 2. Construction of snap-fastener in auto-tagging snares.

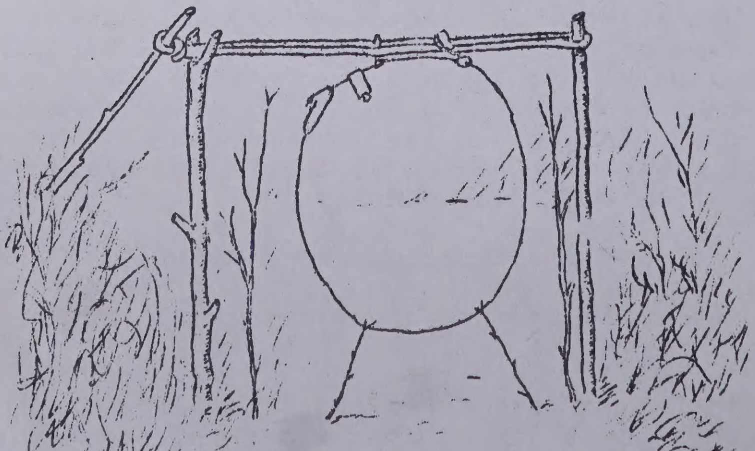

Fig. 3. Method of setting auto-tagging snare for forest birds.

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not loose enough for the animal to escape from it. The slipping movement of the loop must be stopped before the noose is fully tightened around the animal's neck, and also the loop must not be able to move backwards. Those conditions are well fulfilled by a very simple snap-fastener - a trigger that serves as a two-way stop to the tightening loop of the snare (fig. 1).

The snare devised for marking animals consists of two parts, joined together by the snap-fastener through openings or "eyes" at each end of it. The snare should be made of such material that a snared animal can easily break away from it after the snap-fastener, with a "collar" and numbered tag, has been fixed to its neck. The best material for that purpose is ordinary fishing-line which varies in strength according to its diameter in cross-section.

In preparing tagging snares one must make sure that in fastening the snare to the narrow end of the snap-fastener one does not make a large knot, which could prevent the moving loop from slipping over the snap-fastener.

To the wider end of the snap-fastener is attached a "collar" with a numbered tag and a soldered metal ring, whose internal diameter should be equal to the distance between the lower side of the snap-fastener and the end of the tongue. The collar is made of lead alloy (for small mammals and birds) or spring-steel wire (for large animals) and should be of a length corresponding to the circumference of the neck of the animal for which the snare is to be set. It is necessary to allow a little extra length for the collar, so that the snap-fastener may work properly. The dimensions and strength of the snap-fastener must be calculated similarly.

The snap-fastener may be easily made from steel wire of semi-circular cross-section, or, if required in large quantities, from softer materials (iron, brass, bronze), by means of a press, with spring steel being used for making the trigger. In the latter case one may stamp numbers on the long rear end of the snap-fastener, which will relieve one of the necessity of attaching standard tags or pendants to the collar (figure 2).

For automatic tagging of forest birds one makes sets with "ground snares" and stakes, but instead of ordinary snares one uses tagging snares. Each snare on the line is given a serial number (usually it is written on a blazed tree near the snare), and one writes in one's journal the number of the tag and adds all necessary information about the station and location of the snare. Two or three days later the snare-lines are checked, data about sets where tagging has been successful are jotted down, and new snares (either tagging or ordinary) are set. One also enters in the journal the species, sex, and approximate age of the animal, those particulars often being obtainable from feathers or pieces of fur and from tracks.

Auto-tagging snares for hares are set similarly to commercial snares (the snares are set on the hares' paths). Foxes may be tagged in the same way. For martens one uses a baited snare attached to a sloping pole.

Large carnivores (bear, wolf, wolverine, etc.) and ungulates (moose, deer) also may be automatically tagged, as there are very effective methods of snaring those animals. In tagging large animals one may use, instead of ordinary tags, hermetically-sealed medallions enclosing paper "passports". In addition one may attach to the collar a portable apparatus emitting sounds or radio signals.

In skilled hands the snare is a universal method of taking wild animals. We have taken even otters with snares set on their paths, and therefore there are grounds for believing that the tagging of those animals, for the purpose of studying their ecology, is to some extent possible.

The method of ecological study by automatic tagging of wild animals, when further developed and perfected, will permit of wild animals and birds being marked in large numbers without the necessity of human participation in the marking. Experiments in taking forest birds with snares have shown that during one autumn a group of four men marked at least 130 capercailzies and 150 heath-hens when those birds were in average abundance, from 300 to 400 tagging snares being used for each species. In typical forest-bird habitat in the northern taiga sub-zone, birds were taken in every third snare in 1955. By using a large number of snares on permanent traplines, one can tag, and subsequently capture, more than 500 heath-hens and capercailzies.

The laying-out of traplines also enables one to use snares alternately for tagging and for capture. When it is necessary for an animal to come into the investigator's hands alive, an auto-tagging snare should be made of stronger material and provided with a pivot to prevent breakage by twisting. In that case it will be sufficient to use, instead of the catch, a one-way stop (a knot) to the tightening of the snare such as is frequently used by hunters for live-capture of birds and mammals.

The principles of construction and setting of snares for tagging are in no way different from those applying to snares designed for live-capture, and the snares themselves are similar in outward appearance (fig. 3). Therefore the "productivity" of auto-tagging appliances should be entirely similar to that of snares used in ordinary game-taking.

Application of the automatic tagging method opens wide prospects in the study of ecology of wild animals, and of the dynamics and laws of their populations. Mass marking of animals in natural conditions will enable us to determine: (a) the degree of "settledness" of animals so marked; (b) the character of seasonal movements of game animals from place to place; (c) the influence on animals of human activities that change the face of nature; (d) age limits and duration of life of animals in natural conditions; (e) the extent of the effect of hunting on wild animal populations, which will enable us to work out definite norms for annual game harvests.

Automatic tagging may be successfully used with respect to the mating of capercailzies and blackgame. Mass tagging will facilitate the most precise determination of numbers of sedentary species in nature and their dynamics from year to year and from season to season, and also will make possible fuller study of the causes of fluctuations in animal populations. For example, 100 capercailzies were tagged, and some time later 15 of them were recovered among 150 shot and live-trapped in the same district. As marked and unmarked birds were taken without discrimination, it is not difficult to estimate the total population from the known fraction. Since no large movements of the birds were observed, the number of capercailzies in the district studied may be calculated from the equation $X/A=N/B$, where $X=$ the total number of the population, $A=$ the number of the marked birds, $N=$ the number taken, and $B=$ the number of marked birds taken. In our example, the population of capercailzies is found to be 1000.

$$(X = \frac{150 \times 100}{15} = 1000).$$

In the study of the ecology and geographical movements of game animals the method of automatic tagging certainly has notable advantages over all methods now in use. Censusing of game animals and birds with the aid of automatic tagging, and game planning based thereon, may be carried out in any game district of the taiga zone. In the tundra zone the method may be used with great success for tagging ptarmigan and Arctic foxes. The method is more effective at research stations, and it is available to every hunter and investigator who is familiar with the setting of snares for game.

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Having considered the prospects of the above method of investigation, the game section of the Komi Branch of the USSR Academy of Sciences plans to begin in the autumn of 1956 large-scale use of auto-tagging devices for forest birds, fur-bearers, and wild ungulates. Simultaneously work will be undertaken on the improvement of both the devices themselves and the techniques of their use.

Introduction of the method of automatic tagging of wild animals, at first in scientific studies and later in the general practice of game management, will ultimately prove of great value in carrying out game management measures.